

CLAIMS

1. Plant material transformed with DNA encoding a binding protein comprising an AP2 domain amino acid sequence as set forth in SEQ. ID. No. 1.

2. Plant material transformed with DNA encoding a transcription regulating protein from the group comprising SEQ. ID No. 1 and SEQ. ID. No. 2.

3. A chimeric plant-expressible gene, said gene comprising in the 5' to 3' direction:

(a) a promoter capable of effecting mRNA transcription in the selected plant cell to be transformed, operably linked to

(b) a structural DNA sequence encoding SEQ. ID. No. 1 that induces freezing tolerance, operably linked to

(c) a non-translated region of a gene, said region encoding a signal sequence for polyadenylation of mRNA.

4. A chimeric plant-expressible gene, said gene comprising in the 5' to 3' direction:

(a) a promoter that is capable of effecting mRNA transcription in the selected plant cell to be transformed, operably linked to

(b) a structural DNA sequence encoding SEQ. ID. No. 2 that induces freezing tolerance, operably linked to

(c) a non-translated region of a gene, said region encoding a signal sequence for polyadenylation of mRNA.

5. A chimeric plant-expressible gene, said gene comprising in the 5' to 3' direction:

(a) a promoter that is capable of effecting mRNA transcription in the selected plant cell to be transformed, operably linked to

(b) a structural DNA sequence encoding SEQ. ID. No. 1 that induces drought tolerance, operably linked to

(c) a non-translated region of a gene, said region encoding a signal sequence for polyadenylation of mRNA.

6. A chimeric plant-expressible gene, said gene comprising in the 5' to 3' direction:

(a) a promoter that is capable of effecting mRNA transcription in the selected plant cell to be transformed, operably linked to

(b) a structural DNA sequence encoding essentially SEQ. ID. No. 2 that induces drought tolerance, operably linked to

(c) a non-translated region of a gene said region encoding a signal sequence for polyadenylation of mRNA.

7. A chimeric gene capable of expressing a polypeptide in plant cells comprising in sequence:

(a) a promoter;

- (b) a 5' non-translated region;
- (c) a structural coding sequence encoding SEQ. ID No. 1; and
- (d) a 3' non-translated region of a gene.

8. Plant tissue comprising plant cells susceptible to infection with *Agrobacterium tumefaciens* that contain and express a chimeric gene of claim 4, 5, 6, or 7.

9. A method for regulating cold and dehydration regulatory genes in a plant comprising the steps of:

introducing at least one copy of a regulatory gene encoding a protein into a plant;

expressing the binding protein encoded by the regulatory gene;

and

using the expressed binding protein to stimulate expression of at least one environmental stress tolerance gene through binding to a DNA regulatory sequence.

10. A method for regulating cold and dehydration regulatory genes in a plant comprising the steps of:

transforming a plant with a gene encoding a transcription regulating protein comprising an amino acid sequence

sufficiently homologous to SEQ. ID. No. 2 that the protein is capable of selectively binding to a DNA regulatory sequence in

the plant which regulates expression of one or more environmental stress tolerance genes in the plant; and expressing the transcription regulating protein in the plant.

11. A method for regulating cold and dehydration regulatory genes in a plant comprising the steps of:
introducing DNA encoding a binding protein capable of binding to a DNA regulatory sequence into a plant;
introducing a promoter into a plant which regulates expression of the binding protein;
introducing a DNA regulatory sequence into a plant to which a binding protein can bind; and
introducing one or more environmental stress tolerance genes into a plant whose expression is regulated by a DNA regulatory sequence.

12. A method for regulating cold and dehydration regulatory genes in a plant comprising the steps of:
transforming a plant with a gene encoding a transcription regulating protein comprising an amino acid sequence sufficiently homologous to SEQ. ID. No. 1 that the protein is capable of selectively binding to a DNA regulatory sequence comprising CAACA in the plant which regulates expression of one

or more environmental stress tolerance genes in the plant; and expressing the transcription regulating protein in the plant.

13. A chimeric plant-expressible gene, said gene comprising in the 5' to 3' direction:

- (a) a promoter that is capable of effecting mRNA transcription in the selected plant cell to be transformed, operably linked to
- (b) a structural DNA sequence encoding SEQ. ID. No. 2 that induces freezing tolerance.

14. A chimeric plant-expressible gene, said gene comprising in the 5' to 3' direction:

- (a) a promoter that is capable of effecting mRNA transcription in the selected plant cell to be transformed, operably linked to
- (b) a structural DNA sequence encoding SEQ. ID. No. 1 that induces drought tolerance.

15. Plant material transformed with DNA encoding a transcription regulating protein from an amino acid sequence that is at least 85% homologous to SEQ. ID No. 1.

16. Plant material transformed with DNA encoding a transcription regulating protein from an amino acid sequence that substantially similar to SEQ. ID No. 1.

17. Plant material transformed with DNA encoding a cold-regulated transcription factor.

18. The plant material of claim 17, wherein the cold-regulated transcription factor is ZAT12.

19. The plant material of claim 17, wherein the cold-regulated transcription factor is RAV1.